PANEL FOR THE PRODUCTION OF A SWIMMING POOL

The invention relates to the technical sector of constructional elements for swimming pools.

It is known to produce swimming pools using independent modular panels that are assembled together in different ways in order to produce the actual swimming pool. The teaching of patent EP 0382649, of which the applicant for the present patent is also proprietor, may, for example, be cited. According to the teaching of that patent, each panel, of rectangular general shape, has a peripheral framework delimiting vertical flanges for assembly with adjacent modular panels. Each panel has a width that is smaller than its height. By way of indication, the height of the panels is of the order of 4 times its width. For example, this height is approximately 1.20 m, whereas the width is approximately 25 cm.

More generally, these modular panels are obtained by means of a conventional plastics injection-moulding process. Each panel may be formed by a prefabricated structure that receives a reinforcing element shaped as a section in order to receive, over its entire height, the concrete that is in communication with an anchorage. This technical solution offers many advantages over earlier techniques in this field. Furthermore, producing the panels using a plastics injection-moulding process makes it possible to obtain a particularly competitive production cost.

However, by virtue of its principle, the injection-moulding process limits the dimensional characteristics of the panels and also requires the use of very powerful injection-moulding machines.

For these various reasons, it is necessary to limit the

width of the panels in order to obtain an acceptable degree of straightness. Otherwise, the panels will have a tendency to twist. As indicated previously, a width of 25 cm is acceptable within the context of an injection-moulding process. However, using modules with a 25-centimetre base requires numerous joints that are likely to detract from the aesthetic appearance, requiring leaktight assembly between each module.

It is also apparent that the conventional injection-moulding process limits the thickness of the panels and the height of any stiffening ribs that one of the faces of these panels may have. Thus, the width of the ribs considered at their base must be equal, at most, substantially to one third of the thickness of the panel, otherwise sunken areas related to material shrinkage will be created.

With reference to Figure 1, this very diagrammatically illustrates the perfectly well-known principle of the conventional plastics injection-moulding process for obtaining panels. Given that the parting line between punch and die lies in a horizontal plane, the stresses are very great and it is difficult to regulate the thickness.

On the basis of that prior art, the problem that the invention proposes to solve is how to obtain modular panels of much greater dimensions, of the order of 1 m to 2 m or larger, depending on the capacity of the injection-moulding machine, which makes it possible to reduce the number of joints over the relevant length of the swimming-pool, with the objective, also, of being able to produce a panel of greater thickness with, consequently, stiffening ribs that are also larger.

To solve the problem posed, that of increasing the dimensions of the modular panel, particularly its width and its thickness, it is also appropriate to solve the

problem posed of not deforming its structure, in other words of overcoming any problem of twisting.

The problems to be solved being thus posed, a particularly suitable technical solution lies in the use of the compression-injection moulding process for producing swimming-pool panels made from a plastic, particularly a recycled plastic.

Given the application of this compression-injection moulding process, the principle of which is perfectly well known to a person skilled in the art, the panel obtained has a planar or curved quadrangular general shape that is perfectly rectilinear over all its dimensions, at least one of the faces of said panel having stiffening ribs.

To solve the problem posed in particular of assembling the panels together, each panel has, on the ribbed-face side, a peripheral squared framework, the vertical flanges of which have complementary arrangements for coupling with adjacent panels in order to produce the closed structure of the pool.

To solve the problem posed of maintaining the panels in a vertical position, the lower horizontal flange has arrangements for the engagement of members for anchoring in the ground.

To solve the problem posed of obtaining sufficient rigidity for the structure of the panel, while preventing any possible deformation, particularly through the effect of the water pressure exerted, the ribs are formed vertically and/or horizontally on the outer face of said panel.

According to one embodiment, to avoid, in particular, the use of a stiffening upper metal piece, the horizontal upper edge of the outer face of the panel

delimits a strip formed from a plurality of ribs arranged in staggered fashion, particularly in the form of a honeycomb.

After the various panels have been assembled together in the form of the desired swimming pool, and in order to solve the problem posed of being able to fit out the inside of the pool with a leaktight sheet known as a liner, the panel has, in its thickness, in the region of the horizontal upper flange of the framework, a profiled groove for the engagement and the clamping of the liner.

To solve the problem posed of being able to adapt the profile of the panel, the latter has, in its thickness, at regular or irregular intervals and parallel to its vertical edges, reductions in thickness capable of acting as hinges in order to modify the longitudinal profile of said panel as desired.

According to one embodiment, and with a view to being able, after assembly of the panels, to produce an upper anchorage, its outer face has, in its upper part, catching and positioning arrangements capable of interacting with complementary arrangements of attached independent modifiable elements acting as gutters for the pouring of a concrete with a view to forming said peripheral upper anchorage after coupling of the various panels.

According to another embodiment, in order to solve the problem posed of preventing any deformation of the panel through the effect of the stresses exerted because of water pressure, its outer face has, over all or part of its height, catching and positioning arrangements capable of interacting with complementary arrangements of at least one attached independent element acting as a vertical shaft, in communication with the anchorage elements, for the pouring of a

concrete.

Given the application of the compression-injection moulding process to the production of a panel for a swimming pool, the panel may, by way of non-limiting indication, have a length of between 1000 and 2000 mm approximately and a thickness of approximately 7 to 8 mm, the ribs having a thickness of approximately 6 to 7 mm at their base.

The invention is set forth below in greater detail with the aid of the figures of the appended drawings, in which:

- Figure 1 is a purely diagrammatic view showing the principle of the injection-moulding process for producing a panel;
- Figure 2 is a purely diagrammatic view showing the application of the compression-injection moulding process for producing swimming-pool panels;
- Figure 3 is a perspective view of a panel base module resulting from the compression-injection moulding process according to the invention;
- Figure 4 is a plan view of the outer face of the panel;
- Figure 5 is a transverse sectional view considered along line 5-5 in Figure 4;
- Figure 6 is a longitudinal sectional view considered along line 6-6 in Figure 4;
- Figure 7 is a plan view showing an example of the assembly of panels according to the invention, for producing a swimming pool of substantially elliptical general shape;
- Figure 8 is a perspective view of an upper anchorage modular element;
- Figure 9 is a perspective view of an element capable of acting as a shaft;
- Figure 10 is a view similar to Figure 5, showing the fastening of an anchorage element;
- Figure 11 is a partial view, on a larger scale,

showing the principle for fastening the liner.

As indicated, each modular panel, designated overall by (1), is obtained, according to a fundamental characteristic of the invention, by means of the process of compression-injection moulding (Figure 2) from a plastic, particularly a recycled plastic. The application of this process, known as such by a person skilled in the art, makes it possible to obtain a panel having a length (L) of between 1000 and 2000 mm approximately, having a planar or curved quadrangular general shape that is perfectly rectilinear over all its dimensions. In other words, despite the size of the length (L), the structure of the panel obtained has no tendency to twist either in the vertical plane or in the horizontal plane.

At least one of the faces of the panel (1), namely the outer face, has a plurality of stiffening ribs (1a). These ribs (1a) are formed vertically and/or horizontally. The panel (1) has, on its ribbed-face side, a squared assembly and stiffening framework formed by two vertical flanges (1b) and (1c) and two horizontal flanges (1d) and (1e). By way of indication, the thickness (e) of each panel is approximately 7 to 8 mm. It is consequently possible to obtain ribs (1a) having a base part of approximately 6 to 7 mm.

The vertical flanges (1b) and (1c) of each panel have complementary arrangements for coupling with the adjacent panels in order to produce the closed structure of the pool. For example, these arrangements are capable, instantaneously, of assembling the flanges of the modular panels in juxtaposition and simultaneously making the resulting assembly leaktight. Such arrangements are, for example, of the type described in patent FR 2 765 909, of which the Applicant for the present patent is also the proprietor.

According to another characteristic of the invention, the lower horizontal flange (1e) is wider than the other flanges (1b), (1c) and (1d) in order to form a supporting sole plate. Thus, the flange (1e) has any type of arrangement for the engagement of members for anchoring in the ground.

In a simplified embodiment, given the use of the compression-injection moulding process that makes it possible to obtain a relatively thick panel with, consequently ribs that are also suitably dimensioned, it is possible not to use anchorage and shaft elements for the pouring of a concrete.

Advantageously, the horizontal upper edge of the outer face of the panel (1) delimits a strip formed from a plurality of ribs (1f) arranged in a staggered fashion, particularly in a honeycomb (Figure 4). These arrangements avoid, in particular, the use of a stiffening profiled metal piece encircling the upper part of the panels when the latter are produced by means of a simple injection-moulding process.

As already indicated, using the compression-injection moulding process makes it possible significantly to increase the thickness of the panel. This is the case, in particular, of the upper horizontal flange (1d), which may consequently have, in its thickness, a profiled groove (1d1) for the engagement and clamping of a liner (2). In fact, in a known manner, the edge of the liner (2) has a rod or bead (2a) that can consequently be clipped into the profile section of the groove (1d1).

Advantageously, these arrangements avoid the use of an attached catching profile for fastening the liner.

Without thereby departing from the scope of the

invention, it is not excluded that panels should be combined, after assembly in juxtaposition with an upper anchorage and, optionally, with vertical shafts for the pouring of a concrete. According to this embodiment, it is consequently possible to reduce the thickness of the panel.

As Figure 8 shows, the outer face of the panel (1) has, in its upper part, catching and positioning arrangements (1g) capable of interacting with complementary arrangements of attached independent modifiable elements (3) acting as gutters. These elements (3), forming gutters, have, for example, two squared tabs (3a) interacting, for example with pressure, with pegs (1g) formed so as to project from the outer face of the panel. After in-line assembly of the various panels (1) and the various elements (3), a gutter is obtained for the pouring of a concrete with a view to forming a peripheral upper anchorage. It should be noted that each gutter element (3) may be small compared with the panels in question. The squared assembly tabs (3) may, moreover, be offset relative to the length of the element (3) in order to be regularly spaced after in-line assembly of several elements (3). The elements (3) may interact directly or in an attached manner with independent elements (4) acting as shafts for receiving the concrete.

It should be noted that the elements (3) and (4), for the pouring of the concrete forming the upper anchorage, and the vertical shaft may be implemented in accordance with a technical solution that is identical or equivalent to that described and illustrated in the above-mentioned patent FR 2 765 909.

The advantages are clearly apparent from the description and, in particular, the following are emphasised and recalled:

- the application of the compression-injection

moulding process makes it possible to obtain panels of large dimensions without any deformation;

- the modular nature of the thickness;
- the use of an injection-moulding machine that is less powerful than that used in the case of a conventional injection-moulding process;
- the possibility of using recyclable-plastic materials;
- the possibility of obtaining ribs of sufficient dimensions to make it possible to dispense with the use of attached stiffening elements or, at the very least, to reduce the number thereof;
- the catching profile obtained directly at the time of compression-injection moulding, for positioning the liner;
- the upper peripheral ribbing in the form of a honeycomb replaces the metal piece generally used when coupling prior-art injection-moulded panels and designed to form an upper belt.